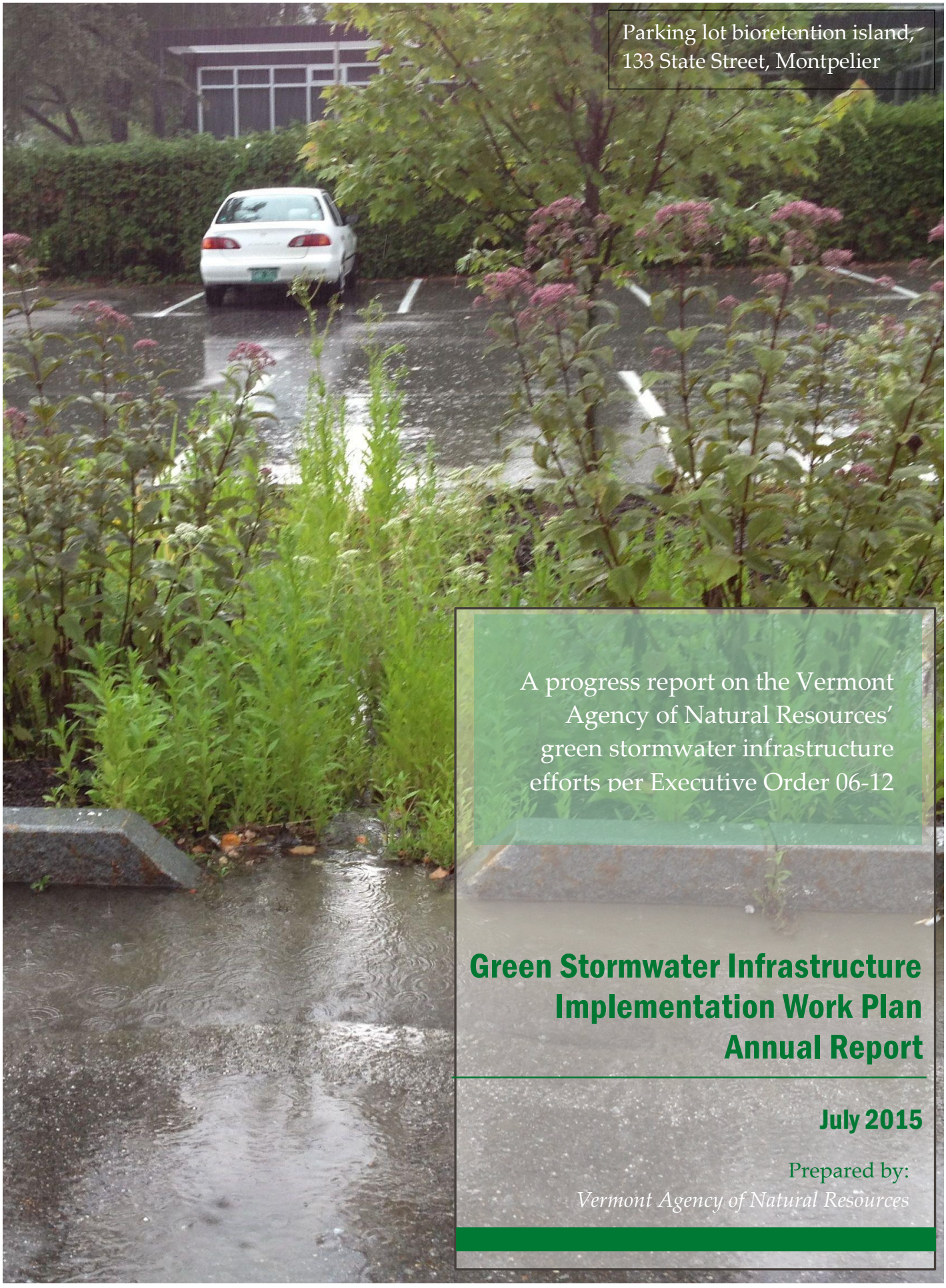

Parking lot bioretention island,
133 State Street, Montpelier

A progress report on the Vermont Agency of Natural Resources' green stormwater infrastructure efforts per Executive Order 06-12

Green Stormwater Infrastructure Implementation Work Plan Annual Report

July 2015

Prepared by:
Vermont Agency of Natural Resources

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Executive Summary

Green stormwater infrastructure (GSI) represents an innovative and beneficial means by which to manage stormwater runoff from developed lands and lands undergoing development. Executive Order 06-12 called upon the formation of an Interagency Green Infrastructure Council. The Council, made up of the Agencies Natural Resources, Commerce and Community Development, and Transportation and the Department of Buildings and General Services, is tasked to identify and seize opportunities to promote, demonstrate, and implement GSI. The following outlines in broad strokes ANR's second year accomplishments as a member of the Council. Such accomplishments include:

- Working closely with the Agency of Commerce and Community Development, the Vermont Agency of Transportation and the Department of Buildings and General Services to identify collective GSI opportunities;

- Hosting a wide variety of workshops, webinars, and trainings for a diverse group of stakeholders including citizens, professionals, municipalities, and state employees;

- Assisting in the coordination of the Green Infrastructure Roundtable and initial implementation of the Vermont Green Infrastructure Strategic Plan 2014 – 2019;

- Providing funding for GSI design and implementation through the Ecosystem Restoration Program;

- Incorporating GSI into the design of a Fish and Wildlife Access area on Lake Champlain;

- Completing the draft update to Vermont Stormwater Management Manual to include a wider array of GSI practices;

- Defining in state statute (2015 Vermont Clean Water Act) the term, "green infrastructure" as an innovative Best Management Practice (BMP) that uses natural and semi-natural landscape features to manage stormwater runoff; and

- As directed in the same statute, furthering the use of "practical and cost-effective" BMPs (such as green infrastructure) to improve the management of *unregulated* stormwater runoff.

Introduction

With the signing of Executive Order 06-12 by Governor Shumlin in 2012, the State of Vermont recognized the important role that Green Stormwater Infrastructure (GSI) plays in enhancing and protecting water quality. Stormwater runoff from developed lands and lands undergoing development is a significant source of nonpoint pollution and GSI provides a mechanism through which that runoff volume and quality can be managed in a sustainable way using natural processes. In addition, GSI also provides myriad other benefits such as carbon sequestration, economic vitality, improved air quality, and aesthetic quality. GSI is a fairly new concept in Vermont and faces many barriers to statewide adoption and implementation including a low level of awareness, a lack of technical details, limited incentives, and regulatory barriers at the local and state level.

The Agencies of Natural Resources (ANR), Commerce and Community Development (ACCD) and Transportation (VTrans) and the Department of Buildings and General Services (BGS), as members of the Interagency Green Infrastructure Council, are working together to overcome many of these barriers to promote the use of green infrastructure as a strategy to sustainably manage stormwater in Vermont. The agencies developed Agency-specific five-year Implementation Work Plans to identify the tasks each Agency will undertake to promote GSI. Since the finalization of the Work Plans in July 2013, ANR has made steady progress in taking action and toward achieving its individual goals.

With widespread recognition of the challenges posed by climate change and development, GSI can play a critical role in our approaches to stormwater management across Vermont's landscape. In terms of prioritization of GSI implementation, GSI will be most cost effective in cases of new development where no stormwater infrastructure exists. Strategic implementation of GSI practices on developed lands will be best utilized to augment treatment of stormwater and to reduce flows to existing traditional gray stormwater infrastructure.

As ANR moves forward with its Work Plan, a focus on the ultimate goal of GSI being the primary tool for stormwater management in Vermont must remain. This document provides a brief review of the major accomplishments by ANR toward this goal for this past fiscal year.

Fiscal Year 2015 Recap

ANR activities for FY2015 were marked by:

- Education and outreach activities by GI Initiative staff;
- Collaboration with ACCD, VTrans and BGS as part of the Interagency Green Infrastructure Council;
- Active collaboration with external partner groups;
- Concerted efforts to assist in updating relevant ANR statutes, policies and program operations;
- Funding of multiple projects from multiple sources, and
- Timely technical assistance provided to seekers of the latest tools for stormwater management.

Education, Outreach and Training

Success Story: Education and Outreach via the FLOW blog

The GI Initiative is promoting GSI in Vermont using electronic media like FLOW, the official blog of DEC's Watershed Management Division. A key part of GSI education is addressing existing misconceptions about stormwater management. The GI Initiative's first post with the question, "Is stormwater just an urban problem?" found an audience. The post, which asks Vermonters to consider the impacts of all precipitation-driven runoff, is currently the second most-read post on FLOW in 2015.

Education, outreach, and training continue to be vital components of the GI Initiative. In 2015, ANR provided over 23 unique presentations across the state specifically focused on green infrastructure, reaching an estimated 800 people. Roughly 29 hours of instruction was provided resulting in an estimated 900 participant hours.

Presentations include, but are not limited to:

- Six webinars on stormwater master planning
- One presentation to multiple groups of middle school students at Addison County Field Days

- One tour of Montpelier with a group of students from Vermont Technical College
- One keynote speech at the Association of Vermont Conservation Commissions Annual Meeting
- One presentation to municipal staff at ANR's Municipal Day
- One presentation to the International Society of Arboriculture
- One presentation at a locally led Stormwater Expo in Springfield
- Three presentations at the Town Officer Education Conferences
- Two webinars on GSI Best Management Practices (BMPs)
- One presentation to attendees at the New England Chapter of the North American Lake Management Society

ANR also provided education, outreach, and training indirectly through various forms of print and online media. At least five separate articles feature green infrastructure on the WSMD Blog. Furthermore, a new partnership with the Valley Green Journal led to the inclusion of two articles on green infrastructure in the November and February editions of this monthly newsletter. Additionally, the GI website was updated in 2015. A number of pages were consolidated and revamped to better portray relevant information, a new series of GSI BMP Factsheets were added.

Collaboration and Coordination

Collaboration and Coordination of activities relating to Low Impact Development (LID) and GSI are at the heart of the ANR's lead role on the Interagency GI Council, comprised of representatives from the ACCD, ANR, BGS, and VTrans. To date, this work has largely been championed and coordinated by GI Initiative staff, housed within DEC Watershed Management Division. The coordination of timely implementation of the FY2016 Work Plan by other state agencies and external partners would benefit from additional staff support.

The Interagency GI Council met a number of times throughout the year to discuss progress on Implementation Plans and opportunities for collaboration. Discussions centered on opportunities for joint trainings and joint funding for design and implementation projects through the Downtown Transportation Fund and Ecosystem Restoration Fund. Highlights of work with partner agencies on the Council include:

- Collaborative efforts by BGS, ANR, and VTrans to develop an auditing process for GSI suitability for state lands and buildings. Future plans to augment this process with on-site assessments will feature the Williston I-89 Northbound Welcome Center as a test site;
- Collaborative efforts by ACCD, ANR, VTrans, and Regional Planning Commissions to assist municipalities minimize damages and ensure economic vitality during times of disaster. Recommendations include using GSI practices to reduce the likelihood of impacts from flooding.

ANR also continues to coordinate the GI Roundtable, which is an ad hoc group of individuals representing various interests focused on the promotion and implementation of LID principles and GSI practices. Started with a small group of individuals in 2009, the Roundtable now boasts roughly 170 members, with a very active core of 15-20 individuals. In 2015, that group successfully drafted and adopted the 2014-2019 Green Infrastructure Strategic Plan which outlines seven strategic objectives. Members of the Roundtable are actively working to implement the plan with support from ANR staff. Quarterly meetings in FY2015 ensured that timely progress on action items and goals occurred that available resources were shared appropriately. At the time of this report, no additional Roundtable meetings are scheduled, representing a potential gap in progress from an effective group of external collaborators.

As an extension of the Roundtable, the GI Initiative manages a GI Google Group. The Google Group is the primary means of communication among Roundtable members. To date, the group includes 367 posts on a variety of topics including webinars, trainings, technical specifications and details, discussions, news articles, funding sources and announcements.

Additional collaborative efforts include direct work with a variety of organizations and agencies on specific projects and programs too numerous to count. Of particular note in 2015 is ANR's work on the promotion and adoption of LID bylaws at the local level with the Vermont Association of Planning and Development Agencies and the Vermont League of Cities and Towns (VLCT). Through funding provided by the United States Forest Service and the Vermont Ecosystem Restoration Program (ERP), these project partners are developing and deploying tools and resources directly to municipalities in an effort to make stormwater management using LID principles and GSI practices more accessible, especially in small rural towns. With nearly 50% of towns lacking any sort of stormwater control, this is an important step in the right direction.

Statutes, Policies and Programs

GI Initiative staff provided useful input on updates to ANR statutes, policies and regulatory programs in FY2015. The 2015 Vermont Clean Water Act (enactment of Vermont General Assembly bill H.35), defined in statute for the first time the term, "green infrastructure" as best management practices that uses a "wide range of multi-functional natural and semi-natural landscape elements that are located within, around and between developed areas, that are applicable at all spatial scales, and that are designed to control or collect stormwater runoff."

This bill also promotes that use of these BMPs by directing ANR to publish by January 2016 a handbook of practical and cost-effective BMPs to improve the management of *unregulated* stormwater runoff.

Another key component of this work centered on promoting GSI BMPs as the preferred tool for managing stormwater and reducing the number of Combined Sewer Overflows (CSOs).

Many decisions regarding stormwater and the use of BMPs are governed by ANR's Stormwater Program. This program administers a post-construction stormwater permit pursuant to state statute. Regulated projects are required to implement stormwater management in accordance with the Vermont Stormwater Management Manual (VSMM). Last year, ANR began a process to update the manual to better match current trends in stormwater management and better align with the goals of the GI Initiative. A preliminary draft of the VSMM update is undergoing internal review. After seeking and incorporating public input, the revision to the VSMM is on track to be adopted via the rulemaking process in by early 2016.

In situations where wastewater and stormwater conveyances are combined and high intensity wet weather events result in overflows, jurisdiction is handled by ANR's Wastewater Program through Vermont's CSO control policy which was adopted in 1990. Given the age of this policy, and advances in CSO management, ANR is in the process of updating this policy. GI Initiative staff introduced draft language to the policy that would require GSI BMPs to be considered as the primary tool for reducing the volume of stormwater flows to combined sewers, and thus reduce CSOs.

Funding

Success Story: Silver Street Bioretention System

Using funds provided by the Ecosystem Restoration Program, the Lewis Creek Association and the Town of Hinesburg replaced existing "gray" stormwater infrastructure with GSI. The system of bioretention cells and vegetated swales provides retention, filtration, and treatment of runoff from 7 acres of impervious surface. This attractive town asset is located at the intersection of Vermont Route 116 and Silver Street.

The ERP provides roughly $2.5 million in state dollars each year for a variety of projects aimed at reducing sediment and phosphorus loads. ERP places a high value on projects that manage stormwater using GSI practices. In 2015, ERP funded 13 GSI projects for a total of $457,798. These projects include five scoping/design studies to evaluate if, where, and how GSI practices

might be used to manage stormwater. These studies are taking place in four counties, supported by $90,110 of ERP monies. Eight GSI implementation projects are underway in six counties, supported by $397,688 in ERP funds. Furthermore, ERP housed and supported ANR's GI Initiative. The GI Initiative is currently being restructured by ERP.

Recent changes to the State Revolving Fund (SRF) and federal law has improved loan fund availability for GSI projects statewide. DEC's Facilities Engineering Division has adopted the nationally accepted Preliminary Engineering Report format for both the Clean Water and Drinking Water SRFs. This format formally encourages the planning and use of GSI on all publicly funded projects. Additionally, federal legislative changes based on the Water Resources Reform and Development Act of 2014, opens up the federal eligibility of watershed based projects and inclusion of GSI.

ANR is turning its attention to creating demand for loans to support GSI, especially for large projects. Currently, there is one GSI project is on the current Clean Water SRF priority list and interest is building. ANR will continue to raise awareness of how the SRF program can become a funding source to help support these projects.

Success Story: Bioretention System at Peoples Academy High School, Morristown

Grants funds from the Ecosystem Restoration Program helped the town of Morristown and the Lamoille County Conservation District install a bioretention treatment system that captures and treats approximately 90% of the stormwater runoff generated from the school campus.

Technical Assistance

ANR's efforts to provide technical assistance have resulted in greater implementation of GSI and development of technology-based tools for use across Vermont. Aside from those mentioned in previous sections of this report, the following are representative of our technical assistance efforts.

By utilizing the assistance of GI Initiative staff, the Vermont Department of Fish and Wildlife is completing renovations, including the construction of multiple GSI practices, at the John Guilmette Fishing Access Area in South Hero. The site will now use bioswales, grass channels, bioretention, and vegetation to treat stormwater runoff.

Success Story: Green Stormwater Practices at the Department of Fish and Wildlife John Guilmette Fish Access Area, South Hero

Construction of the parking lot showing check-dams in the parking lot drainage ditch to help slow water, allow infiltration to occur and reduce stormwater runoff.

A contract to develop a simplified sizing tool for GSI BMPs for Vermont was funded by ERP to in April 2015. The tool is intended to provide small and moderately-sized communities who adopt VLCT's 2015 Vermont LID and GSI By-Law update with a suite of tools to size, and aid in the review of, BMPs.

Updated Implementation Work Plan Task List

In fiscal year 2016, ANR will continue to promote, demonstrate, and implement GSI by undertaking the following tasks.

Task	Task Description	Progress to Date
1	Review current regulatory barriers to GSI and consider revisions where appropriate. • Stormwater Management Manual • Wastewater System and Potable Water Supply Rules • Combined Sewer Overflow Policy • Underground Injection Control • Act 250	- VT Stormwater management manual update underway - CSO policy update underway - Initial coordination with DWGWPD - Participation in Act 250 Criterion 9L discussions
2	Consider the role that GSI plays in the development of reasonable assurances and implementation of total maximum daily loads (TMDLs). • Research the use of GSI in other states to meet regulatory requirements (tree credits, stream restoration, and others) • Provide input into Lake Champlain Phase 1 and Phase 2 plans	- LID and GSI included in draft Lake Champlain TMDL Phase 1 Plan - Tree credit fact sheets developed under contract o Benefits of Trees o Site Scale Tree Credits o Watershed Scale Tree Credits
3	Review existing state programs, processes, and initiatives and develop a plan for incorporating GSI concepts. • Surface Water Management Strategy • Tactical Basin Planning • Stormwater Master Planning • Corridor Planning • Lake Wise Certification Program • Non-point Source (NPS) Management Program • On-site Installer Certification • Climate Cabinet • Flood Ready Vermont	- Revisions to Surface Water Management Strategy - Tactical Basin Planning and Stormwater Master Planning processes include consideration of GSI - Lake Wise Certification Program promoting voluntary use of GSI - Ongoing conversations with Drinking Water and Ground Water Protection Division about on-site installer certification program and tag-on GSI certification - LID and GSI language included in Flood Ready Vermont website and in updated NPS

		Management Program - Informal agreement with the Rivers Management Program to carefully address GSI implementation in river corridors to avoid large infrastructure investment in high risk areas
4	Consider incorporation of GSI concepts as appropriate when developing and implementing new programs.	- Continued discussion about role of GSI in expanded State Revolving Fund - Two GSI interns secured through DEC/University of Vermont (UVM) Internship Program
5	Provide training opportunities to ANR staff and external partners to increase knowledge of GSI. • Annual conference/workshop • Webinars • Presentations	- Eight webinars - Three presentations at conferences - Six talks to municipal groups - Four talks to educational institutions - Two workshops - One stormwater tour - One presentation to realtors - One interagency training -
6	Investigate the modification and development of funding sources to support the utilization of GSI. • 604(b) • ERP • State Revolving Fund (SRF) • Watershed Grants • Water Quality Improvement Fund	- Continued discussions about incentivizing GSI through ERP funding and - Continued discussions about expanding SRF to support more GSI implementation - 604(b) funds awarded to the Northwest Regional Planning Commission to develop an on-line mapping tool of GSI practices
7	Identify gaps in technical information and guidance and develop a plan for creating additional resources. • Gather additional BMP cost, benefit, and performance information and make it readily available • Work with partners to develop Vermont specific resources	- Nine informational fact sheets created - Technical guidance posted to Green Infrastructure Google Group on a regular basis - Coordination with the Vermont Association

		of Planning and Development Agencies on municipal GI toolkit - Coordination with the Vermont League of Cities and Towns on an update to the Low Impact Development Bylaw - Funded consultant via ERP Grant to create a Vermont-specific GSI BMP sizing tool to support sub-jurisdictional GSI implementation
8	Support additional research and monitoring opportunities related to GSI. • Tie in with existing efforts such as the Monitoring Strategy Implementation Team and the Vermont Water Quality Monitoring Council. • Work closely with Vermont institutions to develop and gather Vermont specific data	- ERP staff involved in Steering Committee for UVM Bioretention Laboratory and working with students from Vermont Technical College and Norwich University
9	Seek opportunities for greater inter-agency and intra-agency collaboration and cooperation. • GI Council • GI Work Group	- Shared resources such as technical documents and webinars - Identified future training opportunities - Multi-agency support for GSI workshop - Inter-agency and intra-agency project support
10	Develop a process for auditing GSI on ANR owned and managed lands (e.g. State parks, wildlife management areas, and fishing access areas) and explore opportunities to enhance or utilize additional GSI. • Discuss GSI concepts with ANR Lands Team • Collaborate on capital improvement projects • Leverage experience from other agencies	- Initial discussions with ANR Lands Team about GSI led to involvement by GI Coordinator in Flood Resiliency Scoping Project - GSI assessment protocols developed in New York and Maryland researched and documented and a Vermont specific project is in the works - GI Coordinator involved in Forests Parks and Recreation and Fish and Wildlife capital improvement projects

11	Review GSI components and develop a list of appropriate uses based on land type and land use. • Lakes and ponds • Wetlands • Floodplains • Source protection areas	- Appropriate GSI practices identified as Lake Wise Best Management Practices and discussion occurring between ERP staff and Lakes and Ponds staff regarding BMPs associated with Shorelands permits -
12	Increase coordination between Facilities Engineering Division (FED), Stormwater, Wastewater Management, and Monitoring, Assessment and Planning Program in regards to CSO projects. • Bring appropriate parties together during the preliminary engineering phase for Clean Water SRF projects • Update CSO policy	- Initial meeting of parties hosted by FED - Update of CSO scheduled - Draft CSO policy update that specifically requires GSI written
13	Increase collaboration among and capacity of external stakeholders. • Hold quarterly Roundtable meetings • Review and track progress on Strategic Plan • Support Strategic Plan related efforts • Increase participation in Roundtable	- Roundtable meetings held on 06/11/13 09/17/13, 01/28/14 and 05/28/14 - 2011 – 2013 Strategic Plan progress report drafted - 2014 – 2019 Strategic Plan drafted - Roundtable participation over 150
14	Assist external partners in efforts to provide GSI assistance, outreach, and training to municipal entities, private landowners, and design professionals.	- GI coordinator assisted with rain barrel workshops, realtor workshops, project development and implementation, residential stormwater audits, trainings, project design, and coordination
15	Revisit GSI Implementation Work Plan and review progress. • Add additional challenges and opportunities as necessary • Continue to assume leadership role on Interagency GSI Council.	- Annual progress report submitted July 2014 - GSI Council Meetings held 9/22/14, 2/19/15, and 6/3/15.

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